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ABSTRACT

This paper provides a review and synthesis of the research literature on metacognition and reading in children who are deaf and draws implications of the research for classroom instruction. The review is organized into three categories of studies: descriptive, correlational, and intervention research. The review also includes research on word awareness, an aspect of metalinguistics associated with reading achievement. The review identifies three trends. First, the research suggests that current instructional practices used to teach reading to deaf children might actually hinder their development of mature metacognitive strategies; second, skilled deaf readers resemble skilled hearing readers in their use of reading strategies; and third, deaf students can benefit from metacognitive strategy instruction. An attached table provides comparative data on the major studies reviewed. (Contains 33 references.) (DB)

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Metacognition and Reading in Children who are Deaf: A Review of the Research

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Abstract

The purpose of this paper is to review and synthesize the literature on metacognition and reading in children who are deaf. While this body of research is sparse, three trends are noted. First, the research suggests that current instructional practices used to teach reading to deaf children might actually hinder their development of mature metacognitive strategies. Second, skilled deaf readers resemble skilled hearing readers. And third, deaf students can benefit from metacognitive strategy instruction.

Metacognition and Reading in Children who are Deaf: A Review of the Research

As used by cognitive psychologists, metacognition refers to both the knowledge and the control an individual has over his or her own thinking and learning. Over the past twenty years numerous studies have investigated the normally hearing child and adolescent's metacognitive knowledge about reading. These studies indicate that metacognition about reading develops with age, and in large part is the critical link in the transition between the novice reader and the skilled reader. This body of research also indicates that poor readers, like beginning readers, lack or have incomplete metacognitive knowledge and control of reading. The research is unclear however, as to whether deficiencies in metacognitive skills *result in* reading difficulties or *result from* reading difficulties.

There is not an extensive body of research focusing on metacognition and reading in subjects who are deaf. The findings of the research that has been conducted are however, fairly consistent and do indicate directions for future research as well as implications for classroom instruction. The objective of this review is to synthesize this body of research and to expand on the implications for instruction. To facilitate the review, studies are organized into three categories: descriptive, correlational and intervention research. The review includes work focusing on word awareness, an aspect of metalinguistics which has been associated with reading achievement. This review has been paralleled after a comprehensive review of research on hearing children compiled by Paris, Wasik & Van der Westhuizen (1988).

Descriptive Research

In describing an individualized reading program instituted at the Oregon State School for the Deaf, McCarr (1973) was among the first to contribute to our knowledge about metacognitive awareness in readers who are deaf. She individually

interviewed sixty-eight 7th - 12th grade students. During these interviews, she found that most students reported that they were reading well above their assessed reading level. Correlational studies have since found that readers who are deaf have more difficulty judging their feeling-of-knowing than do hearing readers (Krinsky, 1990; Wood, Griffiths, Webster, 1981).

Three more recent studies have used questionnaires to gain insight into deaf readers' metacognitive knowledge. Ewoldt (1986) interviewed 20 hearing impaired students, ages 8 to 14, about their reading experiences. While Ewoldt found that her subjects expressed a positive attitude toward reading, their responses made her question whether the students understood what reading is. Her data would suggest that the subjects were reluctant to take risks in constructing meaning, perhaps because they had an inappropriate schemata for what reading means. Strassman (1992) drew a similar conclusion when interviewing adolescents ranging in age from 14 to 19. Strassman's data indicated that her high school-aged subjects were skill-oriented and passive participants in school reading activities. Strassman (1992), like Ewoldt (1986), found that her subjects were largely dependent on their teachers as mediators in comprehension of texts. Of particular note is the fact that Ewoldt's subjects had previously participated in a research study which encouraged the subjects to employ independent reading strategies. Those same strategies were not identified by the students as ones they would employ in school.

Ewoldt, Israelite & Dodds (1992) had sixteen deaf high school students ranging in age from 13 to 17 read and retell passages. The students and 9 of their teachers were then interviewed. Based on post-reading interviews and information gleaned from the retellings, the researchers found that the students engaged in metacognitive strategies more while reading a difficult passage. Moreover, the researchers found that students primarily reported using independent strategies (e.g.,

rereading) while teachers primarily recommended dependent strategies (e.g., ask the teacher).

Taken together, the descriptive research would suggest that teachers have concentrated on teaching children who are deaf the basic skills of how to read, without fostering independent strategies for reading to learn and think. Subjects in the Ewoldt et al. (1992) study as well as those in McCarr's (1973) research, may be telling us that they can and/or want to read more difficult and challenging material, but aren't given the opportunities. The studies by Ewoldt (1986) and Strassman (1992) would further suggest that teachers have created a limited schema of reading for deaf students, one that does not include the range of activities and thought processes used by mature readers. This may explain why deaf children use skills and techniques taught, but may not be able to use them spontaneously or strategically (Bebko, Lacasse, Turk & Oyen, 1992; Strassman, Kretschmer & Bilsky, 1987).

Correlational Research

Andrews and Mason (1991) employed a think-aloud paradigm in their study. Fifteen white males from low to low-middle socioeconomic-status families participated in the study. Five of the subjects were prelingually deaf high school students (ranging in age from 17 to 20 years) from a state residential school. Each of these subjects were fluent in ASL and had hearing parents. Two groups of hearing students were used for comparison. The first group ranged in age from 8 to 11 years and was selected as being average students in their grade. The other group was drawn from learning disabled students with at least a 4 year delay in acquiring reading skills. They ranged in age from 14 to 18 years. One student in each group read at each of the following reading grade levels: second, third, fourth, fifth and sixth.

Each student was asked to read three cloze passages: a passage one grade level below his reading level, a passage at his reading level, and a passage one grade level above his reading level. While completing the task, students discussed with the examiner their rationale for their answers to the cloze task. Probing questions were asked by the examiner to help the students verbalize their thinking. Passages were presented on a series of sheets so that the subject could see the correct missing word to an item before preceding to the next cloze blank.

The analysis revealed that the number of strategies used by each subject type increased with reading grade level. Overall, the deaf students used fewer strategies than either hearing group and were less likely to give the actually deleted word or phrase as a response. The deaf students never used the title of the passage and only infrequently employed context clues whereas the hearing students used both of these strategies. The most commonly used strategy by each of the groups was background knowledge. Rereading and look-backs were also employed by each group of subjects.

Davey (1987) designed a study to investigate the benefits of look-backs under different question-type conditions. Sixty-one proficient hearing readers (mean age of 11 years), 62 poor hearing readers (mean age of 15 years) and 50 prelingually deaf readers (mean age of 15 years), all of whom scored between 5.0 and 7.9 grade equivalent on the Reading Comprehension Subtest of the Intermediate Level Stanford Achievement Test, participated in the study. The deaf students all attended a residential school for the deaf. Subjects read 12 passages and then answered WH-questions about the passages. The question types were select-response or construct-response. Each question type was tested under two conditions: with look-back and without look-back.

Proficient and poor hearing readers self-reported that look-back increased their comprehension of a passage. Deaf readers did not, even though their demonstrated comprehension was increased by look-back opportunities. The researcher speculated that the deaf subjects were unaware that the look-back strategy could improve their reading comprehension because they utilized the strategy to complete the task and not to improve comprehension. This is similar to Strassman's (1992) findings that high school students see school-related reading as assignments given by the teacher and not as a means for learning.

In analyzing different data from the same group of subjects as Davey (1987), LaSasso (1985, 1986) found that look-back was used as a visual-matching technique, not a metacognitive strategy. Additionally, she found that subjects who were deaf were less successful in using the technique than were hearing subjects.

The distinction between employing a technique and a metacognitive strategy distinguishes good from poor hearing readers (Armbruster, Echols & Brown, 1982). Gibbs' (1989) data indicates the same is true for readers who are deaf. Gibbs studied 19 high school students who were judged by their teachers to be the top readers in the junior and senior classes. The subjects ranged in age from 16 to 19 and their reading proficiency ranged from fourth to 12th grade as measured by the Gates-MacGinitie. Her data indicated a correlation between reading ability and metacognitive sophistication. She concluded that good deaf readers have much in common with good hearing readers.

Krinsky (1990) studied 40 high school students (ranging in age from 14 to 20) who were not as proficient in reading as those who participated in the Gibbs' study. Krinsky's deaf subjects were reading at a grade equivalent of 1.4 to 5.9 as measured on the SAT-HI. The deaf sample was compared to two hearing groups of students, one group by age and the other by reading level. After subjects defined

words from the Peabody Picture Vocabulary Test they were asked to rank missed words in terms of expected difficulty. The data revealed that the deaf subjects were less likely to guess at word definitions and more likely to say "I don't know." than was either group of hearing subjects. When deaf subjects did guess, their responses were based on visual aspects of the target word, e.g., embedded words within the target item (*date* as a definition for dilapi*dated*) whereas hearing subjects used previous semantic information as a basis for their guessed definitions. The deaf subjects were unable to assess their feeling-of-knowing judgments for vocabulary words whereas both hearing groups were able to do so.

In investigating test-answering strategies, Wood et al. (1981) made a similar finding. Deaf children answered more test items and made more errors than did the hearing children. Furthermore, as a group, hearing children were less likely to answer difficult items.

A few studies have investigated metalinguistic awareness in children who are deaf. Zorfas (1981) found that 4 to 7 year old prelingually deaf children were aware of words as units of language as indicated by their ability to segment Signed English sentences into words. The subjects' abilities increased with age and followed the same developmental pattern found in hearing children. A study by Borman, Stoefen-Fisher, Taylor, Draper & Niederklein (1988) indicated that metalinguistic awareness of meaning is more problematic for deaf children. In this study, subjects aged 5:7 to 10:7 were asked to judge the synonymy of video taped sentences pairs presented in ASL, Pidgin Signed English and Signed English. Across sign systems, the subjects performed equally well, which was only slightly better than chance. The researchers interpreted these results to mean that the subjects had not yet developed the metalinguistic awareness needed to judge synonym in sign. These results were compared to work done by Quigley, Wilbur, Power, Montanelli &

Steinkamp (1976) which asked high school aged deaf students to judge the synonym of printed items. The deaf students performed significantly poorer on that task than did younger hearing children who served as controls.

Gartner, Trehub and Mackay-Soroka (1993) investigated the distinction between words and their referents in 6 to 14 year old deaf children. Their results indicate that word awareness improves with age in both deaf and hearing children however, hearing children have greater overall word awareness than deaf children.

Intervention Research

Three intervention studies have been reported in the literature. Each study found that the subjects' reading performance was improved during the course of the intervention, and for some subjects, strategies taught were maintained after the intervention.

Utilizing a single-subject design, Akamatsu (1988) gave metacognitive instruction in summarization skills to five students ranging in age from 11 to 12 years. During the course of the intervention, all subjects showed marked improvement in their abilities to write summaries. During the maintenance period, three subjects continued to write well formed summaries while a decline in performance was noted in two subjects. Akamatsu notes that initially the teachers involved in the study were skeptical because mechanics of writing (i.e., grammar) was not emphasized. As the teachers saw that cognitive strategy instruction could help their students' writing become more comprehensible and overcome weakness in grammar, they became increasingly supportive and creative in their use of the target strategy.

Satchwell (1993) taught six children ranging in age from 9 to 11 several strategies to use while reading. Five of the six children made significant gains in both reading grade level and ability to use the target strategies.

While both the Akamatsu (1988) and Satchwell (1993) studies involved small numbers of children over short periods of time thereby limiting the generalizability of the findings, both studies point to the need for additional intervention studies. Fox (1994) conducted a larger study both in terms of time and number of subjects. He required Gallaudet undergraduate students in his World Literature Survey course to do metacognitive exercises as a part of the class. These exercises improved student attendance, class discussion and grades.

Synthesis and Future Directions

Insert Table 1 about here

Table 1 summarizes the research reviewed. While the research is sparse, some trends and issues are apparent. First, several researchers question whether or not current instructional practices are leading deaf children away from developing metacognitive strategies by emphasizing skills and school related activities at the expense of reading for meaning and authentic purposes. This type of instruction might actually be giving deaf children the wrong schema for reading, thus leaving them thinking that what they typically do in school (e.g., worksheets, answering teacher questions, or memorizing vocabulary words) characterizes all reading activities. A time-on-task study conducted by Limbrick, McNaughton and Clay (1992) substantiates the question raised here. The researchers found that their deaf subjects spent minimal time actually engaged in reading and were "subjected to teacher interactions that may inhibit the development of meaning-based reading skills" (p. 309). The concern that misfocused instructional practice might be a substantial factor in poor literacy achievement has also been discussed by Gormley and Franzen (1978), Erickson (1987) and Williams (1994).

The second trend emerging from this body of literature is that skilled deaf readers resemble skilled hearing readers. This similarity extends to other aspects of

reading, such as the ability to use phonological coding (see Chapter 6 of Paul & Jackson, 1992, for a review of this literature). Less proficient deaf readers however, often utilize different strategies than hearing students, and in some instances are developmentally behind their hearing counterparts. Given the Ewoldt et al. (1992) finding that deaf high school students are more interested in the most challenging texts and engage in metacognitive strategies more while reading them, one wonders if the low level material that many deaf students are given to read (based on their grade level reading scores) might actually be suffocating their strategy development. Studies on emerging literacy in deaf preschoolers clearly indicate that they learn about literacy in ways similar to hearing preschoolers (Ewoldt 1985, 1991; Maxwell, 1983, 1984; Rottenberg & Searfoss, 1992; Williams, 1994). Why then, is their later skill development delayed and/or different from hearing children?

Third, just as hearing students benefit from metacognitive strategy instruction, so do deaf learners. In addition to the intervention studies reviewed here, the literature on Instrumental Enrichment would further suggest that deaf students can benefit from direct strategy instruction. (See Martin, 1993 for a review of Instrumental Enrichment's potential in regard to literacy.)

While there is still a limited body of research on metacognition and reading in students who are deaf, this literature would suggest that teachers may need to alter their reading instruction to reflect less of school and more of the authentic and purposeful situations in which people read. Research focusing on the benefits of direct strategy instruction as well as on wholistic approaches to reading are needed.

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Author, Year	Descriptive information on the deaf subjects (G.E. = grade equivalent)	Subjects benefited from metacognitive instruction	Subjects' performance reflected previous school instruction	Deaf subjects used a different strategy than did hearing subjects	Subjects used the target strategy, but not metacognitively	Subjects used the wrong strategy or schema for the task	Strategy use increases with reading ability and/or age	Deaf subjects performed similarly to hearing subjects	Subjects could identify metacognitive strategies	Subjects demonstrated delayed strategy development, inability to use the target strategy, or inability to use the strategy spontaneously
Akamatsu, 1988	n = 15 11:3 - 12:4 years old public school for the deaf	X								
Andrews & Mason, 1986	n = 45 5 - 8 years old residential school	X		X						
Andrews & Mason, 1991	n = 5 males 17 - 20 years old G.E. reading level: 2, 3, 4, 5, 6 residential school			X			X	X		X
Bebko, 1992	n = 38 6:0 - 13:11 years old bimodal regional school			X						X
Borman, Stoefen-Fisher, Taylor, Draper & Niederklein, 1988	n = 20 5:7 - 10:7 years old G.E. mean reading level: 2.05							X		X
Davey, 1987	n = 50 mean age 15 years G.E. reading level: 5.0 - 7.9 residential school				X			X		
Davey & LaSasso, 1984	n = 50 mean age 15 years G.E. reading level: 5.0 - 7.9 residential school			X						
Ewoldt, 1986	n = 20 8 -14 years old			X	X	X			X	X
Ewoldt, Israelite & Dodds, 1992	n = 16 13 - 17 years old G.E. reading level: 2 - 8 residential school		X	X					X	
Fox, 1994	Gallaudet undergraduate students	X								X
Gartner, Trehub & Mackay-Soroka, 1993	6 - 14 years old oral and bimodal						X			X

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Author, Year	Descriptive information on the deaf subjects (G.E. = grade equivalent)	Subjects benefited from metacognitive instruction	Subjects' performance reflected previous school instruction	Deaf subjects used a different strategy than did hearing subjects	Subjects used the target strategy, but not metacognitively	Subjects used the wrong strategy or schema for the task	Strategy use increases with reading ability and/or age	Deaf subjects performed similarly to hearing subjects	Subjects could identify metacognitive strategies	Subjects demonstrated a delayed strategy development, inability to use the target strategy, or inability to use the strategy spontaneously
Gibbs, 1989	n = 19 16 - 19 years old G.E. reading level: 4 - 12						X	X		
Hirsh-Pasek, 1987	n = 26 5 - 16 years old	X		X						
Krinsky, 1990	n = 40 14 - 20 years old G.E. reading level: 1.4 - 5.9 residential school			X						X
LaSasso, 1985	n = 50 mean age 15 years G.E. reading level: 5.0 - 7.9 residential school									X
McCarr, 1973	n = 68 grades 7 - 12 residential school									X
Satchwell, 1993	n = 6 9 - 11 years old G.E. reading level: preprimer self-contained public school class	X								
Strassman, Kretschmer & Bilsky, 1987	n = 22 13:4 - 20:2 G.E. reading level: 3.0 - 7.4 bimodal day program									X
Strassman, 1992	n = 29 14 - 19 years old bimodal day program					X			X	X
Wood, Griffiths & Webster, 1981	n = 60 mean age = 11 G.E. mean reading level: 7.9 nonresidential school for the deaf		X	X		X				
Zorfass, 1981	n = 11 4:5 - 7:7 years old bimodal day school						X	X		

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